

The background of the slide is a deep space scene. It features a dark blue and black sky filled with numerous stars of varying brightness. Several spiral and nebulae are visible, adding a sense of vastness and cosmic wonder. On the right side of the frame, a large, reddish-brown planet, likely Mars, is partially visible, showing its textured surface and atmospheric haze. The overall composition is designed to evoke a sense of exploration and discovery.

NASA/MARSHALL SPACE FLIGHT CENTER

JOINT COUNSELING SESSION

September 15, 2020

Background

COMPANY NAME:	Archarithms, Inc. (dba Arcarithm)	ADDRESS:	303 Williams Avenue, Suite 131/132 Huntsville, AL 35801
OWNER:		CONTACT NAME:	Randy E. Riley
EMAIL:	randy.riley@arcarithm.com	YEARS IN BUSINESS:	8
CAGE CODE:	6s1z4	DUNS NUMBER:	078491477
WEB SITE:	www.arcarithm.com	NAICS CODES:	541715 primary, 541330, 541511, 541512, 541513, 541519, 541990
CERTIFICATIONS (e.g., ISO 9001, AS 9100, etc.): AS9100, CMMI Level 3			

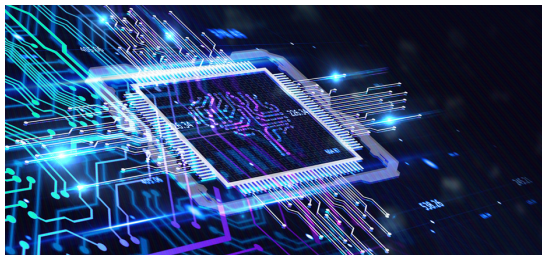
Business Size & Classifications

EMPLOYEES (range):	10-50
AVERAGE SALES (range):*	\$8-16.5M

CLASSIFICATIONS (select from list below):	Yes/No
SMALL BUSINESS	Yes
SMALL DISADVANTAGED BUSINESS	No
NATIVE AMERICAN-OWNED	No
ALASKAN NATIVE CORPORATION	No
WOMEN OWNED	No
ECONOMICALLY DISADVANTAGED WOMEN OWNED	No
VETERAN-OWNED	No
SERVICE DISABLED VETERAN OWNED	No
HUBZONE CERTIFIED	Yes
8(A) CERTIFIED	No
8(A) EXPIRATION DATE (if applicable)	No

*Based around NAICS 541715

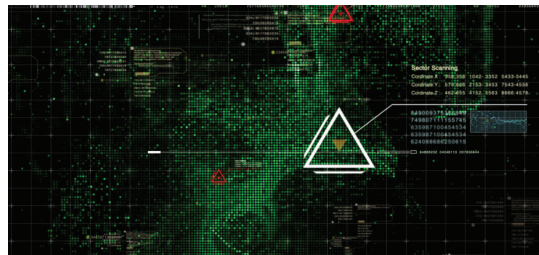
CORPORATE CAPABILITIES



ARTIFICIAL INTELLIGENCE SOLUTIONS

Arcarithm's advanced data processing pipeline provides very large volumes of physical and synthetically generated training data that can be used to improve model performance, to a degree that is not possible with publicly available image data sets.

- **Video Analytics (Computer Vision)**
- **Decision Support**
- **Customer Relationship Management**
- **Condition Based Maintenance**
- **Physical and Synthetic Data Creation and Augmentation**
- **Edge and Ruggedized Computers/Sensors**



COMMAND AND CONTROL SOLUTIONS

Arcarithm is an expert in developing optimization and artificial intelligence algorithms. Arcarithm's algorithm development process leverages decades of working with multiple complex systems at all levels. Our solutions have been fielded and are working optimally.

- **Battle Management**
- **Sensor Management**
- **Fire Control**
- **Planner**
- **Human/Machine Interface**
- **Big Data Analytics and Management Frameworks**
- **Energy Management**



TECHNICAL SERVICES SOLUTIONS

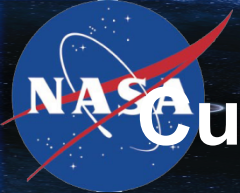
Arcarithm has a unique innovative approach for tackling problems and managing change, providing a faster way to solve problems. Arcarithm is fast to adopt new tools and techniques and where the tools and techniques do not exist we create them. Our systems engineering process provides a big picture view with a holistic approach, resulting in greater mission success and higher quality solutions at a lower risk.

- **Full Stack Software Development**
- **Software IV&V**
- **DevSecOps**



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DFARS 252.204-7012 Compliant



Current and Recent Contracts/Performance (< 5 years)

Business Area	Customers	Focus
Artificial Intelligence	US Army	Computer Vision, AI Infrastructure
	Missile Defense Agency	Information Systems, Big Data Analytics
	US Air Force	Computer Vision
	US Navy	Information Systems
Command and Control	US Army	Planning, Command and Control
	Missile Defense Agency	Resource Management, Planning, Human Machine Interface
	US Navy	Planning, Information Systems, Computer Vision
	Nasa	Planning, Human Machine Interface
Technical Services	Large Primes – Lockheed Martin, Raytheon, General Dynamics	Full Stack Software Development, Database Development, Human Machine Interface
	US Army	Software independent Verification and Validation



NASA Value - Quad Chart



Problem(s):

- Current complex mission planning processes base decisions on mostly inflexible assumptions and, as a result, introduce increased risk in those decisions if the assumptions turn out to be wrong. The scenarios do not account for uncertainty—the potential for many possible futures to emerge and the inability of any planning process to accurately identify the range of scenarios that may place dominant demands on the infrastructure in 10 years or 20 years.

Company Solution:

- Arcarithm's Acquire is a flexible, extensible, comprehensive Course of Action (CoA) analysis and dynamic planning tool that facilitates complex mission success.
- Acquire was developed for the Missile Defense Agency and has been used by the Army and partially for NASA
- Arcarithm modified Acquire for Mission to Mars planning

Value:

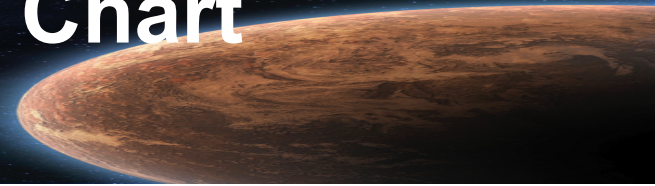
- Acquire is a rapid, dynamic planner and CoA recommender that optimizes available resources for complex mission planning.
- Fast and accurate – optimizes on solutions in minutes.
- Automated metric evaluation, analyses with no lengthy simulation runs.
- Faster-than-real-time simulation reduces run time and enables rapid Monte Carlo studies.
- Web-based GUI (laptop, smart phone, table, AR/VR) provides metrics in a distributed fashion.
- Scalable SOA enables expansion to include multiple missions and resources

Status of Solution

- Acquire is currently at TRL 6+ with some optimization algorithms deployed in theater for the US Army



NASA Value - Quad Chart



Problem(s):

- Whereas humans have the potential to make errors, Artificial Intelligence has the benefit of being supported by machines, which have much superior computation abilities than humans, such as the ability to sift through enormous amounts of data and use that data to make better decisions.

Company Solution:

- Unlike market competitors Arcarithm's advanced data processing pipeline provides very large volumes of physical and synthetically generated training data that can improve model performance, to a degree not possible with publicly available image data sets.
- Arcarithm's AI big data solutions automatically estimate metrics, generate quick-look reports and provides predictive metrics from big data. Reliably identifies and detects subtle features and data trends and provides a set of tools that allow Subject Matter Experts (SMEs) to understand and evaluate data more effectively.

Value:

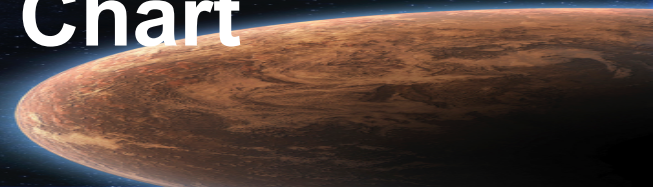
- Video Analytics (Computer Vision) Real time and post processing Detection/Identification of Guns, Manned and Unmanned Aircraft, Commercial and Military Vehicles, Humans
- Decision Support
- Customer Relationship Management
- Condition Based Maintenance
- Big Data Analytics
- Physical and Synthetic Data Creation and Augmentation
- Edge and Ruggedized Computers/Sensors

Status of Solution

- Arcarithm's Synthetic Data capabilities are operational today providing data to the US Army, TRL 7
- Arcarithm's Video Analytics (Computer Vision) capabilities are currently operational providing value to the US Army and the US Air Force, TRL 7
- Arcarithm's Big Data capabilities are being developed for the Missile Defense Agency, TRL 3
- Arcarithm's Computers/Sensors are being used today to develop AI Solutions. The Edge computer/sensor is in field testing.



NASA Value - Quad Chart



Problem(s):

- High-robust system and software assessment services (SAS) applicable across ground systems and manned and unmanned space applications
- Sustainable knowledge management across multiple SAS service providers and efforts, with variance between potentially-stove piped efforts
- Human spaceflight systems and ground control involve extensive human-machine interface (HMI) and human factors engineering, requiring a systems-oriented view of software in an integration and testing context
- Developer hesitancy to release product for review

Value:

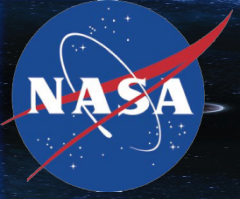
- High defect identification density and removal efficiency, producing results faster reducing cost of fix
- Pure risk approach with “eye-to-the-future” schedule view enables rapid identification and adaptation to program changes, reducing schedule and budget flux
- Knowledge management improves synergies across multiple SAS efforts, improving team effectiveness
- Built-in-not-bolted-on approach to software qualities – reliability, security, testability – increases quality while reducing development cost

Company Solution:

- Systems-oriented knowledge-enabled system / software development and analysis using Agile methodology
- Innovations from in-process evaluation of Catalogue of Methods, producing continuous capability improvement
- Language- and tool-agnostic solution based on decoupled micro-services in full-stack framework
- Pure-risk-oriented planning mechanism with a reverse-scheduling horizon
- Effective communication via “loyal opposition”
- Implemented with US Army and MDA, including space environment rating and reliability

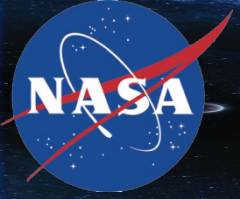
Status of Solution

- Engineering services solution is at TRL 9 for ground systems, TRL 8 for unmanned flight systems
- Scaled Agile Framework (SAFe®) for Government certification, with corporate-level all-Agile policy
- AS9100 Quality Management System certification
- Immediate ability to support multiple programs in Huntsville / Redstone Arsenal
- 100% telework capability with collaborative teaming



Awards/Notable Accomplishments

- 39 SBIR Awards to date - Success in delivering high reward solutions in high risk environments
- Russel G. Brown Leadership Award
- Mentioned 8 times by Gartner for advanced technology
- Artificial Intelligence
 - “Your solution is more advanced than anything we have seen” – A. Y. Senior Software Analyst US Army Counter Rocket Artillery
 - “Arcarithm’s Data pipeline innovation enables product leaders to accelerate time to production/time to value” – Gartner



Awards/Notable Accomplishments

- Command and Control

- “Arcarithm’s Ominis solution provides strong features that benefit event pre-execution/planning, integration, execution and post-run analysis” – Lockheed Martin MASC-F Team
- You guys understand the problem better than anyone we have seen” - M.S., US Navy
- Arcarithm has been by far our easiest integration effort. They have remained flexible and capable of all requirements and changes given to them.” – T.N. US Army Contractor Tech Lead

- Technical Services

- We don’t have to tell the Arcarithm’s team what to do, they tell us what will work. We expected to find 9 critical issues over the life of the project, the Aracritm team found 27 in the first two weeks” – J. C. US Army
- Arcarithm is a company that strives to deliver a quality product that meets the mission requirements on time and within the budget in a professional manner. It is a pleasure to work with Arcarithm.” – B.L. General Dynamics, Manager

Principle Point(s) of Contact

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